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68072	7590	12/21/2010		
SCOTT R. COX				
LYNCH, COX, GILMAN & MAHAN, P.S.C.				
500 WEST JEFFERSON STREET				
SUITE 2100				
LOUISVILLE, KY 40202				
EXAMINER				
JOHNSON, KEVIN M				
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1732				
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

SCOX@LCGANDM.COM

HHART@LCGANDM.COM

KWATKINS@LCGANDM.COM

Office Action Summary

Application No.

10/551,606

Applicant(s)

BURGFELS ET AL.

Examiner

KEVIN M. JOHNSON

Art Unit

1732

Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 July 2010.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 16-28 and 35-63 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 16-28 and 35-63 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-942)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 7/16/2010 has been entered.

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claim 58 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The claim recites "A process for catalytic or cracking" of hydrocarbons, but it is not clear what "a process for catalytic" entails. One of ordinary skill in the art would not be able to determine the metes and bounds of a claim directed to "a process for catalytic."

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and

the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 16-19, 21-28, 35-48, 50, 51 and 53-63 are rejected under 35 U.S.C. 103(a) as being unpatentable over Katovic et al. (Chemistry Express, 1991, Vol. 6, No. 12, pp. 969-972) in view of Rosinski et al (US 3832449), Kuhl (US 4552739) and Kresge et al. (US 4599475).

In regard to claim 16, Katovic teaches a method of synthesizing ZSM-12 zeolites. The method comprises mixing an aluminum source, a sodium source, precipitated silica as a silicon source, water and TEABr to form a hydrogel system. The hydrogel is

crystallized under static conditions at autogeneous pressure in autoclaves (p. 969). The solid produced was ZSM-12 zeolite. Katovic only contemplates a single $\text{H}_2\text{O}:\text{SiO}_2$ molar ratio of 20 (abstract). The required $\text{H}_2\text{O}:\text{SiO}_2$ molar ratio is not disclosed by Katovic, and Katovic is silent as to the properties of the produced ZSM-12 zeolite. The surface area of the precipitated silica employed in the process is not disclosed by Katovic, but it is disclosed that the particle size and associated surface area of the reagents used is important (p. 971). Stirring the mixture during the crystallization process is not disclosed by Katovic.

Rosinski discloses a method for producing ZSM-12 zeolite. In an exemplary embodiment of the process an $\text{H}_2\text{O}:\text{SiO}_2$ molar ratio of 13.5 was employed in the reaction mixture (example IV).

Kuhl teaches that when crystallizing ZSM-12 zeolites the reaction mixture may be either static or stirred (column 3, lines 31-32).

Kresge teaches that precipitated silica with surface areas of 140-160 m^2/g are particularly preferred for the production of ZSM type zeolites (column 9, lines 18-22). Precipitated silica with surface areas of 140-160 m^2/g are considered to have unusually high surface areas (column 9, lines 18-22).

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize a $\text{H}_2\text{O}:\text{SiO}_2$ molar ratio in the range required by the claims in the reaction mixture disclosed by Katovic. Such a modification would have been motivated by the teaching in Rosinski that ZSM-12 reaction mixtures may utilize $\text{H}_2\text{O}:\text{SiO}_2$ molar ratios of 13.5 (example IV). It would have been obvious to one of ordinary skill in the art

at the time of the invention to stir the ZSM-12 reaction mixture utilized by Katovic during the crystallization process. Such a modification would have been motivated by the teaching in Kuhl that ZSM-12 reaction mixtures may be stirred during crystallization (column 3, lines 31-32). It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize precipitated silica with a surface area of less than 200 m²/g in the process disclosed by Katovic. Such a modification would have been motivated by the teaching in Kresge that precipitated silica with surface areas of 140-160 m²/g are particularly preferred for the production of ZSM type zeolites and that precipitated silica with surface areas of 140-160 m²/g are considered to have unusually high surface areas. Katovic fails to disclose that the precipitated silica has unusual properties and so one of ordinary skill in the art when considering the disclosure of Kresge would not expect the precipitated silica employed by Katovic to have a surface area in excess of 160 m²/g. As the process disclosed by the prior art meets all the limitations of the process in the instant claim, and utilizes the same materials, the zeolite produced by the process would necessarily exhibit the properties required by the instant claim.

In regard to claim 17, Katovic discloses a M_{2/n}O:SiO₂ ratio of 0.1 (sample 4).

In regard to claim 18, Katovic discloses a SiO₂:Al₂O₃ ratio of 100 (sample 4).

In regard to claim 19, the crystallization in the process disclosed by Katovic occurs at 150-170°C (p. 969).

In regard to claim 21, Katovic discloses a crystallization time of 6 days, or 144 hours (fig. 10).

In regard to claim 22, Rosinski teaches that the solid is washed, dried and calcined at 1000°F (example IV). The calcination takes place over a period of 5 hours (example I).

Kuhl teaches that the dried zeolite product is sized prior to calcination at 600°C (example 2).

It would have been obvious to one of ordinary skill in the art at the time of the invention to wash, dry, comminute and then calcine the solid produced by the process as required by the instant claims. Such a modification would have been motivated by the teaching in Rosinski that the solid may be washed, dried and calcined for a period of 5 hours (example I), and the teaching in Kuhl that the solid ZSM-12 product may be sized, or comminuted, prior to calcination at 600°C (example 2).

In regard to claim 24, Rosinski teaches that the material may be ion exchanged with an aqueous solution of ammonium chloride, and then calcined (example IX).

Kuhl teaches that after ion exchanging the material it is washed, dried and then calcined (examples 2 and 3).

It would have been obvious to one of ordinary skill in the art at the time of the invention to ion exchange the material with an ammonium compound, and then wash, dry and calcine the resulting product. Such a modification would have been motivated by the teaching in Rosinski that the material may be ion exchanged with an aqueous solution of ammonium chloride, and then calcined (example IX), and the teaching in Kuhl that after ion exchanging the material it is washed, dried and then calcined (examples 2 and 3).

In regard to claim 25, Rosinski teaches that ZSM-12 zeolites may be molded, by methods including extrusion (column 6, lines 11-14).

In regard to claim 26, Rosinski discloses that a binder may be added to the zeolite material to form a composite. The aluminosilicate preferably accounts for 20-50 wt-% of the resulting composite (column 6, line 63 - column 7, line 2). The binder would then account for 50-80 wt-% of the composite material.

In regard to claims 27 and 28, Rosinski teaches that a form of the ZSM-12 product that incorporates platinum is particularly useful (column 3, line 61 – column 4, line 22).

In regard to claims 35-41, the process of the prior art, Katovic, Rosinski and Kuhl, is the same as the process utilized to produce the zeolite product of the instant claims, and therefore would necessarily produce the same product. For a detailed discussion of the synthesis process see the rejection of claims 16-28.

In regard to claim 42, Rosinski teaches that the ZSM-12 zeolite may be employed as a catalyst for the conversion of organic compounds (column 4, lines 23-25).

In regard to claim 43, Rosinski teaches that ZSM-12 zeolites may be molded, by methods including extrusion (column 6, lines 11-14). It would have been obvious to one of ordinary skill in the art at the time of the invention that the extruded material may be considered to be in lump form.

In regard to claim 44, Rosinski discloses that a binder may be added to the zeolite material to form a composite. The aluminosilicate preferably accounts for 20-50

wt-% of the resulting composite (column 6, line 63 - column 7, line 2). The binder would then account for 50-80 wt-% of the composite material.

In regard to claims 45-48, Rosinski teaches that a form of the ZSM-12 product that incorporates platinum is particularly useful as a catalyst (column 3, line 61 – column 4, line 22).

In regard to claim 50, Rosinski teaches a method for converting an organic feed stream by charging the feed stream over a catalyst containing a ZSM-12 type zeolite (example X).

In regard to claims 51, 54 and 55, Rosinski teaches a process for the hydroisomerization of normal paraffins utilizing the ZSM-12 catalyst. The process takes place at a temperature of 300-550°F, with a liquid hourly space velocity of 0.01-2 in the presence of hydrogen (column 7, lines 30-35). The pressure at which the process is performed is not disclosed, and is therefore considered to be atmospheric pressure. The hydroisomerization of higher paraffins is not expressly disclosed. A process for the production of olefins from straight chain hydrocarbon compounds produces a significant amount of C₅⁺ gasoline and therefore the organic feed stream must contain higher paraffins (example X and XII).

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the hydroisomerization treatment disclosed by Rosinski to treat higher paraffins. Such a modification would have been motivated by the teaching in Rosinski that the process is useful for the treatment of normal paraffins, and that the

zeolite catalyst is useful for the treatment of straight chain compounds with a chain length greater than C₅ (examples X and XII).

In regard to claim 53, Rosinski teaches that the catalyst may be used for aromatic hydroisomerization (column 7, lines 36-38).

In regard to claims 56-62, Rosinski teaches that the catalyst may be used in processes for reforming hydrocarbons, reduction of pour points of paraffinic charge stocks, polymerization of olefins or acetylinic hydrocarbons, alkylation of hydrocarbons, dehydration/hydration of organics and dehydrogenation of organics (column 3, lines 5-23). A catalyst comprising a ZSM-12 material may also be employed in a process for the desulfurization of organics (column 7, lines 44-47).

In regard to claim 63, Kuhl discloses that ZSM-12 based catalysts may be utilized in processes for the conversion of alcohols to hydrocarbons (column 5, lines 36-42).

5. Claims 20 and 49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Katovic, Rosinski, Kuhl and Kresge as applied to claims 16 and 45 above, and further in view of Sumitani et al. (US 4557919).

In regard to claim 20, Katovic, Rosinski, Kuhl and Kresge fail to teach the extent of the washing process.

Sumitani discloses a process for producing ZSM-12 zeolites in which the produced zeolites are washed with pure water until the ion conductivity of the wash water is less than 50 $\mu\text{S}/\text{cm}$ (column 8, lines 40-43).

It would have been obvious to one of ordinary skill in the art at the time of the invention to wash the material produced by Katovic, Rosinski, Kuhl and Kresge with

water until the conductivity of the wash water was in the range required by the instant claim. Such a modification would have been motivated by the teaching in Katovic, Rosinski and Kuhl that the zeolite product is washed and the disclosure in Sumitani that ZSM-12 zeolites are preferably washed with pure water until the ion conductivity of the wash water is less than 50 $\mu\text{S}/\text{cm}$ (column 8, lines 40-43).

In regard to claim 49, Katovic, Rosinski and Kuhl fail to disclose the amount of catalytically active component contained in the catalyst.

Sumitani discloses a platinum containing catalyst, where the platinum accounts for 0.01-5 wt-% of the catalyst composition (column 11, lines 22-25).

It would have been obvious to one of ordinary skill in the art at the time of the invention to include a catalytically active component in the amount required by the instant claim. Such a modification would have been motivated by the teaching in Sumitani that ZSM-12 containing catalysts beneficially contain a catalytically active component, such as platinum, in an amount of 0.01-5 wt-% of the catalyst composition (column 11, lines 22-25).

6. Claim 52 is rejected under 35 U.S.C. 103(a) as being unpatentable over Katovic, Rosinski, Kuhl and Kresge as applied to claim 51 above, and further in view of Monque et al. (US 5576256).

In regard to claim 52, Katovic, Rosinski, Kuhl and Kresge fail to disclose the use of n-octane in a hydroisomerization process.

Monque discloses a hydroisomerization process that utilizes a ZSM-12 containing catalyst (column 3, lines 36-40) and for the treatment of an n-octane feed stream (column 7, lines 56-59).

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize an n-octane feed stream in the hydroisomerization process disclosed by Katovic, Rosinski and Kuhl. Such a modification would have been motivated by the teaching in Monque that ZSM-12 containing catalysts, the type utilized by Katovic, Rosinski and Kuhl, are especially suited for the treatment of n-octane.

Response to Arguments

1. Applicant's arguments filed 7/16/2010 have been fully considered but they are not persuasive.

The argument that Katovic teaches away from $\text{H}_2\text{O}:\text{SiO}_2$ ratios of 5-15 is not persuasive. It is acknowledged that Katovic does not disclose $\text{H}_2\text{O}:\text{SiO}_2$ ratios other than 20. The disclosure of an $\text{H}_2\text{O}:\text{SiO}_2$ ratio of 20 in Katovic is important, but is not equivalent to teaching away from $\text{H}_2\text{O}:\text{SiO}_2$ ratios other than 20. The only conclusion that the disclosure of a $\text{H}_2\text{O}:\text{SiO}_2$ ratio of 20 in Katovic supports is that an $\text{H}_2\text{O}:\text{SiO}_2$ ratio of 20 may be employed in the production of ZSM-12 zeolites.

The comparative test results referred to by applicant for the purposes of showing that zeolites prepared with $\text{H}_2\text{O}:\text{SiO}_2$ ratios of 20 or greater are not ZSM-12 zeolites has not been presented in affidavit form. Even if the data were presented in proper form, the comparative test results referred to by applicant can not overcome the express teaching in Katovic that ZSM-12 zeolites are produced.

The argument that Rosinki teaches away from the use of precipitated silica is not persuasive. It is acknowledged that the exemplary embodiments disclosed by Rosinski utilize colloidal silica, but this teaching is not equivalent to teaching away from the use of other silica sources. The only conclusion that the disclosure of processes utilizing colloidal silica supports is that colloidal silica may be employed as the silica source in the production of ZSM-12 zeolites.

The importance of the distinction between colloidal silica and precipitated silica to the applicants is not germane to the analysis of the prior art.

The argument that Comparative Example 5 in the instant application demonstrates that colloidal silica can not be utilized to produce ZSM-12 is not persuasive. Comparative Example 5 does result in the production of ZSM-12, the recovered product is 70% ZSM-12. Contrary to the applicant's assertion, Comparative Example 5 establishes that colloidal silica can be utilized as the silica source in the production of ZSM-12 with a reasonable expectation of success. The instant claims do not exclude processes in which other zeolites are produced, but merely require that the process produce ZSM-12.

The argument that a negative inference that precipitated silica may not be used in the production of ZSM-12 zeolites may be drawn from the teaching in Rosinski of examples that utilize colloidal silica to produce ZSM-12 is not persuasive. The instant claims have not been rejected on the premise that Rosinski could have taught the use of precipitated silica, but on the basis that the combination of the teachings of Katovic and Rosinski considered together disclose the use of precipitated silica. There is no

teaching in Rosinski that would lead one of ordinary skill in the art to believe that precipitated silica could not be utilized. To employ applicant's reasoning, Rosinski could have taught that precipitated silica could not be utilized, but did not. Teachings that are not present within the disclosure of the prior art may not be read in to the prior art as limitations thereof.

The argument that Katovic discloses that only precipitated silica may be utilized for the efficient production of ZSM-12 is not persuasive. The instant claims do not require that the process "efficiently" produce ZSM-12, and do not exclude processes that produce other zeolites in addition to ZSM-12. The examples disclosed by Katovic that utilize colloidal silica do produce ZSM-12. Katovic expressly discloses that when either precipitated silica or colloidal silica is employed in the process ZSM-12 is produced. This is an express teaching present in Katovic.

The argument that Katovic and Rosinski can not be combined because they teach away from each other is not persuasive. For all of the reasons detailed above, Katovic does not teach away from the process disclosed by Rosinski that includes $\text{H}_2\text{O}:\text{SiO}_2$ ratios other than 20 and colloidal silica and Rosinski does not teach away from the disclosure in Katovic that precipitated silica may be utilized.

The argument that Kresge can not be combined with Katovic or Rosinski is not persuasive. It is acknowledged that Kresge is directed to a ZSM-23 zeolite. However, Kresge has been relied on solely for the teaching that precipitated silica with a specific surface area meeting the requirements of the instant claims may be employed for the production of zeolites. The silence in Katovic as to the physical characteristics of the

precipitated silica would lead one of ordinary skill in the art to look to other zeolite production processes for guidance on appropriate surface area regimes of the precipitated silica. Kresge is just such a process.

The argument that there is no apparent reason provided for the combination of Katovic, Rosinski and Kresge is not persuasive. Katovic and Rosinski are combinable as similar methods for the production of ZSM-12, with Rosinski providing guidance on an area not investigated by Katovic, appropriate $\text{H}_2\text{O}:\text{SiO}_2$ ratios. Kresge is combinable with Katovic and Rosinski as a source of guidance on the physical properties of precipitated silica employed in the production of zeolites. Katovic does not address the surface area of the precipitated silica utilized in the process and Kresge provides guidance on the precipitated silica surface area regime that is especially useful for the production of zeolites. The reasons for combining the prior art references were provided in the rejection of the instant claims.

2. Any inquiry concerning this communication or earlier communications from the examiner should be directed to KEVIN M. JOHNSON whose telephone number is (571)270-3584. The examiner can normally be reached on Monday-Friday 9:00 AM to 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Curtis Mayes can be reached on 571-272-1234. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Kevin M Johnson/
Examiner, Art Unit 1732

/David M Brunsman/
Primary Examiner, Art Unit 1732